

REMARKS

Some typographic corrections have been introduced as amendments. The title of this invention has been amended. Some of the rejected claims have been amended to remove the rejections. No new matter has been added.

Applicants note that the Office Action disposes of claim 25 as pending and rejected. *See* Office Action, p.1, Office Action Summary. However, the Office Action does not provide statutory or any other legal basis for rejecting claim 25. *See* Office Action, pp. 2-5. Applicants request that claim 25 be examined and that the legal basis for the disposition of the claims, including claim 25, be provided.

Applicants submit this Amendment "A" and Response for the Examiner's consideration. Reexamination and reconsideration of the application, as amended, in view of the following remarks are respectfully requested.

1. STATUS OF THE CLAIMS

Claims 1-25 were presented for examination; claims 1-25 stand rejected and pending in the application. Claims 22-24 are rejected under 35 U.S.C. § 112 ¶ 2. The rejected claims have been amended as to overcome the rejections based on § 112 ¶ 2. Claims 1-6, 8-10 and 13-21 stand rejected under 35 U.S.C. § 102(e). Some claims are amended to overcome some of these rejections whereas some of these rejections are traversed below. Claims 7, 11 and 12 stand rejected under 35 U.S.C. § 103(a). These rejections are traversed below.

2. RESPONSE TO REJECTIONS

2.1. Claim Rejections Under 35 U.S.C. § 112 ¶ 2

Independent claim 22 and its dependent claims 23-24 stand rejected under 35 U.S.C. § 112 ¶2. The Office Action alleges that the “limitation in lines 12 and 13 are indefinite because the language and wording of the phrase makes it difficult to determine the structure being described.” Office Action, p. 2.

Independent claim 22 has been amended and the recited characteristics of a sleeve insulator have been reworded, including the characteristics recited in lines 12 and 13. By way of illustration, and not of limitation, Applicants refer to, for example, Figures 8 and 9 depicting an sleeve insulator layer. It is shown therein a sleeve insulator layer 50 that extends from a conductor layer 46 to terminate within the lower bulk insulator layer 36 above a semiconductor substrate 12 (shown in, e.g., Figs. 1-12, 10, 11, 13-16. Reference to these Figures is provided for the purpose of illustrating language in lines 12-13 of claim 22, but it is not meant to limit claims 22-24 to specific features depicted in the Figures referred to above.

The amendments introduced in independent claim 22 are incorporated into claims 23-24 because these claims depend from claim 22.

In light of the rewording and foregoing considerations, Applicants respectfully submit that claims 22-24 comply with 35 U.S.C. § 112 ¶2, and reconsideration and withdrawal of these rejections are respectfully requested.

2.2. Claim Rejections Under 35 U.S.C. § 102(e)

Independent claim 1, and dependent claims 2-6 and 8-10;
independent claim 13, and dependent claim 14; and

independent claim 15, and dependent claims 16-18; and

independent claim 19, and dependent claims 20-21;

stand rejected under 35 U.S.C. § 102(e). The Office Action alleges that the rejected claims are “anticipated by Gardner”, U.S. Pat. No. 5,973,910 (hereinafter “Gardner”).

The recitations in amended independent claims 1, 13 and 15 include, *inter alia*, “a conductor structure extending from and beyond the sleeve insulator layer” (claim 1), “a conductive plug extending from and beyond the sleeve insulator layer” (claims 13 and 15). These recitations are incorporated into dependent claims 2-6, 8-10, 14, and 16-18 because these claims depend directly or through other dependent claims from the amended independent claims.

Gardner, in contrast, discloses a side wall insulator 107 that is co-extensive with interconnection layer 108 up to contact region 115. *See, e.g.*, Gardner, Fig. 2 and corresponding description at col. 5, ll.18-19. Because Gardner relies on different structure than that recited in claims 1-6, 8-10, 13-18, these claims do not read on the invention disclosed by Gardner.

Independent claim 19 recites, *inter alia*, “a capacitor storage node in contact with the active region”. This recitation is incorporated into dependent claims 20-21 because these claims depend directly or through other dependent claims from independent claim 19. Gardner, in contrast, does not disclose an invention that comprises such two structures in contact. Because the structure recited in claims 19-21 is not found in Gardner, claims 19-21 do not read on Gardner.

Because claims 1-6, 8-10, 13-21 do not read on Gardner, Gardner does not anticipate the subject matter recited in these claims. As stated by the Federal Circuit,

Anticipation requires the presence in a single prior art reference disclosure of each and every element of the claimed invention, arranged as in the claim.

Lindermann Maschinenfabrik GmbH v. American Hoist & Derrick Co., 730 F.2d 1452, 1458, 221 U.S.P.Q. 481, 485 (Fed. Cir. 1984). Consequently, Gardner does not anticipate the invention recited in these claims. Applicants respectfully submit that claims 1-6, 8-10, 13-21 patentably distinguish over Gardner, and reconsideration and withdrawal of this rejection is respectfully requested.

2.3. Claim Rejections Under 35 U.S.C. § 103(a)

Claims 7 and 11-12, that depend on claim 1, stand rejected under 35 U.S.C. § 103(a) as “being unpatentable over Gardner ... as applied to claim 1 ... [in the rejection under 35 U.S.C. § 102(e)] and further in view of Dennison et al.” (U.S. Pat. No. 5,338,700) (hereinafter (“Dennison”). Office Action, p. 3. Furthermore, the Office Action cites Gardner as providing the disclosure of a compositional element that supplements the contact structure disclosed in Gardner as applied to claim 1. More specifically, the Office Action asserts that it would have been obvious “to modify the contact structure of Gardner with a nitride because Dennison discloses that nitride is a suitable material for insulating a contact structure”. Office Action, p. 4.

As noted above, independent claim 1, and thus its dependent claims 7, 11, and 12, recite a conductor structure extending from and beyond the sleeve insulator layer. In contrast, the structure disclosed in Gardner has a side wall insulator that is co-extensive with the interconnection layer material 108 all the way down to contact region 115. *See, e.g.*, Gardner, Fig. 2 and its corresponding description.

As reasoned below, the noted difference between the contact structure recited in claims 7, 11, and 12, and the structure disclosed in Gardner is not merely a matter of design choice or arbitrary election of insulator sleeve length. Gardner discloses a structure that connects an upper capacitor plate to an underlying conductive level and to form this structure Gardner first etches a series of layers 101-105; it is with this etching that via 112 is entirely formed from top to bottom. *See*

Gardner, Figs. 1A-1B, col. 4, *ll.* 36-63, particularly *ll.* 50-51. Gardner subsequently deposits insulative layer 106 and forms side wall insulator 107 by anisotropic etching. *See* Gardner, Figs. 1C-1D, col. 4, *ll.* 64-67, col. 5, *ll.* 1-17. Finally, Gardner deposits conductive layer 108 in via 112, which may also be filled with conductive material in an etch-back or a polish-back process to form an electrically conductive plug. *See* Gardner, Figs. 1E, col. 5, *ll.* 18-33. Accordingly, Gardner obtains a contact structure with a side wall insulator 107 in an opening or via 112 filled with an electrically conductive plug extending from upper interconnection layer 108 to contact region 115. These side wall insulator, opening or via, and electrically conductive plug in Gardner are co-extensive and they have the same height as the cavity that is formed by the initial etching in its entirety.

As noted in the present Application, a process and structure such as that disclosed in Gardner does not recognize and address the problem of alignment which is addressed by the claimed invention. *See, e.g.,* Application, p. 3, *ll.* 17-26, p. 4, *ll.* 1-16 in contrast with Application, p. 5, *ll.* 14-26, p. 6, *ll.* 1-11, p. 14, *ll.* 9-16, 22-26. Gardner does not teach the process used to manufacture the claimed invention and Gardner does not teach the contact structure recited in claims 7, 11, and 12.

Because of the limitations in its teachings, Gardner does not teach or suggest the contact structure recited in claims 7, 11, and 12. Furthermore, the problems solved by the claimed invention as recited in the same claims would not be solved by the implementation of the teachings provided by Gardner. Thus, the contact structure that leads to the solutions provided by the rejected claims would not have been sought by using the structures disclosed in Gardner.

Because of differences and limitations such as those described hereinabove, Gardner has not suggested the claimed subject matter, and it may not be asserted that the teachings provided by

Gardner are sufficient for one of ordinary skill in the art to make the substitutions, combinations or other modifications that are necessary to arrive to the claimed invention as recited in claims 7, 11, and 12 .

In addition, Gardner does not provide any suggestion or teaching that the claimed invention should have been carried out and would have had a reasonable likelihood of success. To this respect, the Federal Circuit has explained that “[t]he consistent criterion for determination of obviousness is whether the prior art would have suggested to one of ordinary skill in the art that this process should be carried out and would have a reasonable likelihood of success.” (Citations omitted). *Rockwell Int’l Corp. v. United States*, 147 F.3d 1358, 47 U.S.P.Q.2d 1027, 1033 (Fed. Cir. 1998).

Furthermore, in light of these differences and limitations in Gardner, “a person of ordinary skill, upon reading the reference, would be discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that was taken by the applicant.” *United States v. Adams*, 383 U.S. 39, 52 (1966). *See also W.L. Gore & Assocs. v. Garlock, Inc.*, 721 F.2d 1540, 1550-51 (Fed. Cir. 1983), *cert. denied*, 469 U.S. 851 (1984). In addition, “[b]oth the suggestion and the expectation of success must be founded in the prior art, not in applicant’s disclosure.” *In re Dow Chemical Co.*, 837 F.2d 469, 473 (Fed. Cir. 1988).

Consequently, Applicants respectfully submit that Gardner does not support a *prima facie* case of obviousness regarding claims 7, 11, and 12. Applicants respectfully request the reconsideration and withdrawal of this rejection.

It has not been established that Dennison provides any basis that would overcome the limitations and differences established with respect to the disclosure in Gardner. Furthermore, even if Dennison were combined with Gardner, the combination would not teach the contact structure

recited in any of the claims 7, 11, and 12; therefore, neither Gardner nor Dennison combined with Gardner may render the subject matter recited in such claims obvious.

Consequently, Applicants respectfully submit that neither Gardner nor Dennison supports a *prima facie* case of obviousness regarding claims 7, 11, and 12. Applicants respectfully request the reconsideration and withdrawal of this rejection.

3. CONCLUSIONS

In view of the above, Applicants respectfully maintain that the present application is in condition for allowance. Reconsideration of the rejections is requested. Allowance of claims 1-25 at an early date is solicited.

In the event that the Examiner finds any remaining impediment to a prompt allowance of this application which could be clarified by a telephonic interview, or which is susceptible to being overcome by means of an Examiner's Amendment, the Examiner is respectfully requested to initiate the same with the undersigned attorney.

Dated this 31st day of January 2001.

Respectfully submitted,



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